

conjunction with inserting a needle into the subject body, actuates the pump causing fluid to flow through the hollow needle accomplishing an injection. An emergency stop button is provided in case an error is made, ex., the needle goes through the ear, or through the ear and into the user's hand, to prevent injection of a medicament into the user. This is an important deterrent to self-injection. An additional embodiment provides a safety interlock member which must be depressed to the needle hub to close the electrical switch which in turn actuates the pump causing fluid flow through the hollow needle only when the needle is fully injected actuates an injection. This safety interlock is adjacent to the needle and positioned to extend to the length of the needle. This safety interlock is then depressed to the point adjacent to the needle hub as the needle is inserted. At this juncture, an internal extended rod from the safety interlock closes the electrical circuit by means of a Hall-effect switch. This, in turn, actuates the pump to cause fluid flow through the needle. This feature also deters accidental self-injection. Injection cannot take place until the needle is fully inserted, thus enabling the operator to withdraw an accidental stab prior to injection taking place. The goal of both of the systems is operator safety. Self-injection is a very serious accident among vaccinating crews.--

cor
Q

Please replace the paragraph beginning at page 3, line 19, with the following rewritten paragraph:

A2

--The delivery system is powered by a compact, rechargeable 12-volt battery or 110 volt AC/12 volt DC converter, although other electrical means could be used, for sustained operation reducing fatigue and the likelihood of repetitive stress injury to the operator.--

Please replace the paragraph beginning at page 5, line 26, with the following rewritten paragraph:

A3

Turning now to the drawings, in which like reference characters refer to corresponding elements throughout the several views, Fig. 1 illustrates an electrically powered automatic veterinary medicament delivery system, shown generally at 20. System 20 is housed in a container such as a back pack and includes a hand-held unit 40 in fluid communication, by means of conduit tubing 78, with a medicament container 70. A first embodiment hand-held unit 40, single needle 56, no dye means, is especially for use in injection of a medicament into the ear of a bovine. All of

the hand-held units 40 have a generally cylindrical shape with a flattened surface 41 on which, in embodiments one through three, are mounted both a trigger 42 and an emergency stop 44 button. The fourth embodiment also has a trigger but no emergency stop. Also shown are a green LCD 48, which lights to indicate an injection is in progress, and a red LCD 50 which lights to indicate that the medicament level is low. The "function" key pad 108 is touched on the control unit 110 to set the anticipated number of total count so that the low medicament bottle LCD lights up at the appropriate time, ex. when 90% of the doses have been given. Head lamp 46 is used to illuminate the area of injection, as well as an optional dye pad 172 along with the needle mount 58, in actual use, a Luer lock, all mounted on a proximal surface 22 of the hand-held unit 40". Entering this distal end 24 of hand-held unit 40" is tubing 82 containing medicament 84, dye 86 and electrical power cords 88. All of the various hand-held unit embodiments 40, 40', 40'', 40''' & 40''', look and work similarly. A pump 100, which sits atop a control unit 110, sucks up the medicament from within medicament container 70 through tubing 80 and forces the fluid medicament from pump 100 exiting through tubing 82 and continuing through conduit tubing 78 for delivery by the hand-held unit 40 through a hollow needle 56. The control unit 110 utilizes an electronic dosage control 130, shown in detail in Fig. 7, to deliver a predetermined precise amount of medicament upon injection. Additionally, the electronic dosage control 130 provides means of changing the dosage of these predetermined precise amounts of medicament. Control unit 110 also provides optional marking means. Marking dye, in an optional embodiment shown at Figs. 2, 3, & 5, is delivered through dye means, such as by an applicator pad 172, simultaneously with injection of the medicament, marking the individual poultry, porcine, ovine or other animal injected. Control unit 110 function key pad 108 has an on/off control of dye means. Control unit 110 also provides for counting the number of injections made.--

Paragraph beginning at line 27 of page 6 has been amended as follows:

--In all of the disclosed embodiments, fluid from more than one medicament container 70 can be injected simultaneously through their respective tubing 80, the medicaments forced by the pump 100,

through an optional mixing tube 190, shown in detail in Fig. 10, intermixing the two medicaments prior to their being injected through the selected hand-held unit 40, 40', 40'', 40''' or 40'''. Additionally, in all of the embodiments, fluid from more than one medicament container 70, 70' can be injected simultaneously. Where different dosages are needed, two control units 110, 110' with the associated pumps 100, 100' can be connected up to a single hand-held unit 40, 40', 40'' 40''' or 40''' for simultaneous injection, either after mixing the medicaments and injected through hand-held unit 40 40'' and 40''', or when the medicaments cannot be mixed for whatever reason, by injecting simultaneously through two needles through hand-held unit 40' as shown in Fig. 4. Once the requirements are determined, which medicaments are to be injected, can they be mixed, if not, are they administered at the same dosage, the appropriate hand-held unit 40, 40', or 40'' is selected and electronically connected to control unit 110 by the Amp connector 94, attached to the end of conduit tubing 78 and in fluid communication by means of a quick connect fluid connector 196 at the end of each tubing 82, 76,. If the medicaments may be mixed, the mixing tube 190 must be attached to the tubing 82 by quick connect fluid couplers 196. Quick connect fluid couplers 196 are also mounted on pump 100 to attach tubing 80 to medicament container 70. If more than one pump is needed but the medicament to be administered can be given at the same dosage, then a two pump system 100, 100', such as shown in Fig. 8, is used. Hand-held unit 40, 40' or 40''' may be used. When the medicament to be administered is not of the same dosage, and cannot be mixed, then two control units 110, 110' must be used, such as shown in Fig. 9, then hand-held unit 40'' is selected and connected to both control units 110, 110' by means of conduit tubings 78, 78'. A nine-pin amp connector 94 connects the electronic control unit 110 to any of the hand-held units 40. A four-pin amp connector 122 connects the electronic control unit 110 to the dye pump. Another four-pin amp connector 124 connects the control unit 110 to the battery 126. These different types of amp connectors protect against accidental connection of the wrong device to the outlet at the control unit 110.--

Please replace the paragraph beginning at page 9, line 16, with the following rewritten paragraph:

25

Fig. 5 is an end view of a fourth embodiment hand-held unit **40'''** which has a pistol grip **30**. In this embodiment, the generally cylindrically shaped hand-held unit **40'''** is basically turned upside down so that the flattened surface is on the ventral side. The trigger **42** is mounted on the front surface of the pistol grip **30** for convenience of the user. This embodiment has the same elements on the proximal surface **22**, namely a needle mount **58**, a hollow needle **56**, an optional dye means **170**, with associated dye tubing **86**, and headlight **46**. Added to this embodiment is safety interlock **150** which consists of a solid member **152**, which when forced by contact with the subject animal skin, from a first, extended position, to a second retracted position in alignment with the proximal surface **22**, releases the needle mount to allow injection to occur. The safety interlock **150** is designed to prevent accidental injection of the human user of the system. Accidental injection of certain veterinary products can cause severe injury of the area accidentally injected. Mounted on hand-held injection device **40'''** is solid member **152**, a solid member preferably of plastic, which in its first position, extends at least as far as the tip of needle **56**. Solid member **152** is urged to a second position, pushed to the tip of the needle hub **57**, as indicated by arrow in **Fig. 11**, when the needle **56** and therefore the solid member **152** comes into contact with the body of the poultry or other animal. When solid member **152** is biased to the second position, it completes the electrical circuit and actuates the pump **100** which permits an injection to take place. This built-in safety device deters accidental, and severely injurious, self-injection. Needle **56** is replaceable. When needle guard solid member **152** reaches a second position, it actuates a Hall effect switch, such as made by the Allegra Corp, of Worchester, Mass., internal of the hand-held injection device **40'''** which controls administration. This Hall effect switch, shown in detail at **31** in **Fig. 13**, is wired in conjunction with the trigger **42** on the hand-held injection device **40'''**, making it necessary for the trigger **42** to be depressed in order for the switch at the solid member **152** to work. This feature adds materially to the safety and reduced fatigue of the operator, as well as the speed of operation since the operator can depress the trigger **42** constantly allowing injection to occur automatically and as quickly as solid member **152** is depressed. -

Please replace the paragraph beginning at page 12, line2, with the following rewritten paragraph:

Q6 --Fig. 7 is a perspective view of the interior of the control unit of Fig. 6. Electronic dosage control 130 uses a photo-optic unit to control the volume of medicament fluid pumped by pump 100. Pump 100 drives shaft 134 which turns an encoder disc 132 that has slots that are placed at a calibrated distance from one another around the perimeter of circular encoder disc 132. As the encoder disc 132 rotates in response to rotation of drive shaft 134, the slots pass between an emitter and a receiver of a photo-optic sensor 138. The encoder disc 132 passes through the sensor 138. The sensor 138 "counts" the number of slots that pass between an emitter and receiver. The combination of the distance between the slots and the number of slots allowed to pass through the sensor 138 determines the amount of serum that is dispersed. This sensor 138 is wired into a circuit board 140 which includes a micro chip 142 which allows selection and control of the distance the fluid travels in pump 100. This method is preferred because of the ease in changing doses and in view of the changing viscosities of the medicaments used. To change the dose, the user manipulates the function mode by pressing the "Function" key pad 108, of control unit 110. The current number of pulses will flash on the display 112. The pulse count can then be changed by pressing the "UP" or "DOWN" key pad 106 until the correct number of pulses are shown. The press the "Function" keypad 108 to set the correct dose. The LCD display 112 will then stop flashing.--

Please replace the paragraph beginning at page 13, line 12, with the following rewritten paragraph:

Q7 --Fig. 10 is a side view of a medicament mixing tube 190 with quick connect fluid connectors 196 at either end. Y-shaped coupling 198 brings together the two medicaments to mixing tube 190. This tubing is inserted in the tubing somewhere between the pump 100 and any of the hand-held injection devices 40, 40', 40'', 40''' or 40'''''. Injectable medicaments from two different sources may be mixed together by use of this mixing tube 190 prior to injection. This is used where the separate injectibles are compatible. In the case where they are not able to be mixed for some reason, the two injection hand-held injection device 40'' is used. In use, the mixing tube 190, having a cylindrical barrel chamber 192 with a centrally positioned mixing member, double helix fins 194 shaped as two worm gears rotating in opposite directions, is provided enabling mixing together of two fluids for